

REMARKS

In response to the Office Action dated January 28, 2002, claims 14, 16-21 and 28 are amended, claims 15 and 31 are canceled, and claim 49 is added. Claims 1, 2, 4, 6-10, and 14-49 are now active in this application. Care has been exercised to avoid the introduction of new matter. Adequate descriptive support for the amendment can be found in the specification.

REJECTION OF CLAIMS UNDER 35 U.S.C. §103

Claims 1, 2, 4, 6-10 and 14-48 were rejected under 35 U.S.C. 103(a) as being unpatentable over Hayashino (U.S. Patent No. 5,682,376), in view of Hyll (U.S. Patent No. 6,005,893). The rejection is respectfully traversed because the cited references, even combined, do not support a prima facie case of obviousness.

A *prima facie* case of obviousness under 35 U.S.C. § 103 requires three criteria be met. First, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Second, there must be some suggestion or motivation in the references themselves to modify the reference or to combine reference teachings. Third, there must be a reasonable expectation of success for the modification or combination of references. Further, the teaching or suggestion to make the modification or combination of prior art and the reasonable expectation of success must both be found in the prior art, and not based on Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). The teachings, motivations or suggestions to combine references must be based on objective evidence of record and cannot be resolved on subjective belief and unknown authority. *In re Lee*, Federal Circuit Case No. 00-1158 (January 18, 2002). Additionally, there must be particular finding as to the specific understanding or principle within the knowledge of a skilled artisan that would have

motivated one with no knowledge to the claimed invention to combine or modify references. *In re Kotzab*, 217 F.3d 1365, 55 U.S.P.Q.2d 1313 (Fed. Cir. 2000). Hayashino and Hyll, even combined, do not teach or suggest every limitation of the claims.

For example, claim 1 is directed to a sender for use in a communication system that includes "a sending signal generating means for converting an input signal into carrier signals...; and a selection control means for controlling intensity distribution of said carrier signals according to transmission characteristics of said carrier signals detected on the receiver side." In rejecting claim 1, the Office Action contended that Hayashino, by revealing an OFDM system, discloses every feature of claim 1 except for the selection control means. The Office Action relied on Hyll to alleviate this deficiency. Applicants respectfully disagree.

Hayashino is directed to a method for transmitting orthogonal frequency division multiplex (OFDM) signal. A guard interval insertion device adds front and rear guard intervals to each symbol of the OFDM signal to reduce waveform distortion due to reflected waves. According to Hayashino, "an OFDM transmission system is adapted to divide coded data and sort the same into at least hundreds of carriers for multiplexing and transmitting the data (col. 1, lns. 17-21)." Namely, what OFDM systems do is dividing input bit streams into a plurality of segments and multiplexing the segments into separate channels to modulate a plurality of carriers. Although OFDM systems indeed use multiple orthogonal carriers in the frequency domain for modulation, the signals modulating the carriers are a plurality of different signal segments, not an input signal as required by claim 1.

The Hyll reference, contrary to the Examiner's contention, does not disclose the feature of "a selection control means for controlling intensity distribution of said carrier signals according

to transmission characteristics of said carrier signals detected on the receiver side." Hyll is related to a multi-channel transmission for sending signal bits. The signal bits are divided into a plurality of bit segments and transmitted in different sub-channels by modulating carriers with different frequencies. Sub-channels are assigned different numbers of bits based on the transmission quality of that sub-channel: more bits are assigned to sub-channels with high transmission quality and vice versa. Thus, Hyll adjusts the number of signal bits for each channel, not the intensity distribution as required by claim 1. Accordingly, Hayashino and Hyll, even combined, do not teach every limitation of claim 1 and cannot support a prima facie case of obviousness. The rejection is thus untenable and should be withdrawn. Claims 2, 4 and 6-8 depend on claim 1 and incorporate every limitation thereof. Therefore, the obviousness rejection of the claims should also be withdrawn based on at least the same reasons as well as their own merits.

Claim 9 is related to a sender having limitations comparable to claim 1, and further requires that the carrier signals are "non-interfering with each other both on the axis of frequency and the axis of time." Claims 10 and 29 also require that the carrier signals are non-interfering with each other both on the axis of frequency and the axis of time. As discussed above, neither Hayashino nor Hyll disclose these features. Thus, claims 9, 10 and 29, and claims depending thereupon are patentable over the cited references.

Claim 14, as amended, is directed to a receiver that includes "transmission line characteristics measuring means for receiving carrier signals that the sender send in after converting an input signal into said carrier signals..., and selection control means for controlling the intensity distribution of said carrier signals in synthesizing carrier signals based on the transmission characteristics on said transmission line of the respective carrier signals." Claim

28, as amended, includes similar limitations. As discussed above, neither Hayashino nor Hyll disclose these features. Therefore, the cited references, even combined, do not teach or suggest every limitation of the claims and thus fail to support a prima facie case of obviousness. The obviousness rejection is untenable and should be withdrawn. Claims 16-27, 30, 31, 33 and 35-48 depend on claims 14 and 28 respectively and incorporate every limitation thereof. Thus, the obviousness to the claims should also be withdrawn based on at least the same reasons as well as on their own merits. Favorable consideration of the claims is respectfully requested.

CONCLUSION

Therefore, the present application claims subject matter patentable over the references of record and is in condition for allowance. Favorable consideration is respectfully requested.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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VERSION WITH MARKINGS SHOWING CHANGES MADE

IN THE CLAIMS

Please cancel claims 15 and 31.

Please amend claims 14, 16-21 and 28 as follows.

14. (Twice Amended) A receiver for use in a communication system in which a sender and a receiver are connected to each other via a transmission line, said receiver comprising:

[a] transmission line characteristics measuring means for receiving carrier signals that the sender send in after converting an input signal into said carrier signals and for determining transmission line characteristics in respective frequency bands for said carrier signals; [and]

[a] receiving signal synthesizing means for synthesizing the outputs of said transmission line characteristics measuring means; and

selection control means for controlling the intensity distribution of said carrier signals in synthesizing carrier signals based on the transmission characteristics of respective carrier signals [wherein said carrier signals are generated based on the same input signal].

16. (Twice Amended) [A] The receiver as defined in claim [15] 14, wherein said selection control means selects signals to be put to said receiving signal synthesizing means from said carrier signals.

17. (Twice Amended) [A] The receiver as defined in claim [15] 14, wherein said selection control means provides a uniform distribution mixing ratio among all the carrier signals to be put to said receiving signal synthesizing means.

18. (Twice Amended) [A] The receiver as defined in claim [15] 14, wherein said selection control means provides a weighted distribution mixing ratio among all the carrier signals to be put to said receiving signal synthesizing means on the basis of the transmission line characteristics of the corresponding carrier signals.

19. (Twice Amended) [A] The receiver as defined in claim 14, wherein [a] the transmission line characteristics measuring means determines the signal intensity of said carrier signals received.

20. (Amended) [A] The receiver as defined in claim 14, wherein [a] the transmission line characteristics measuring means determines the relative phase of said plurality of carrier signals received in relation to a reference phase.

21. (Twice Amended) [A] The receiver as defined in claim 14, wherein [a] the transmission line characteristics measuring means determines both the signal intensity of said carrier signals received and the relative phase of said carrier signals received in relation to a reference phase.

28. (Twice Amended) A communication system in which a sender and a receiver are connected to each other, wherein the sender has:

a carrier signal generating means for generating a plurality of carrier signals with different frequencies based on an input signal; and,

a multiplication means for sending out on a transmission line said carrier signals modulated by said input signal; and,

wherein the receiver is provided with:

a transmission line characteristics measuring means for receiving the carrier signals modulated by said input signal from the sender and for determining transmission line characteristics in respective frequency bands of said carrier signals; and

a receiving signal synthesizing means for synthesizing said carrier signals on the basis of the transmission line characteristics;

wherein, at least one of the sender and the receiver includes a selection control means for controlling the intensity distribution of the carrier signals based on the transmission characteristics of the respective carrier signals.

Please add claim 49 as follows.

49. (NEW) The sender of claim 10, further comprising selection control means for controlling the intensity distribution of the plurality of signals according to transmission characteristics of respective signals detected on the receiver side.